

CLAIMS

1. A method of operating a radio system comprising first and second stations (10, 20), the method comprising the first station (10 or 20) transmitting a signal, the second station (20 or 10) receiving the transmitted signal at a plurality of spaced locations, analysing the received signal by frequency domain analysis to calculate the number of specular reflections and the reflection coefficient for each specular reflection, one of the first and second stations transmitting and receiving a radar signal, said one station scaling the received radar signal to appear as if it had been transmitted by the other of the first and second stations, analysing the scaled signal to determine bounds for at least one parameter of the specular reflections, utilising the results of the analysis of the radar signal at the second station to reduce the bounds on the at least one parameter by matching the specular reflection from the frequency domain analysis and the scaled radar signal, and optimising a parameter model of the received signal using the reduced bounds on the at least one parameter and the number of reflections identified in the frequency domain analysis.
2. A method as claimed in claim 1, characterised in that the at least one parameter is amplitude (a_n).
3. A method as claimed in claim 1, characterised in that the at least one parameter is time delay (τ_n).
4. A method as claimed in claim 1, characterised in that the bounds of at least two parameters are determined.
5. A method as claimed in claim 4, characterised in that the at least two parameters are amplitude (a_n) and time delay (τ_n).

6. A method as claimed in claim 1, characterised in that the second station comprises a plurality of spatially separated antennas for receiving the transmitted signal.

5 7. A method as claimed in claim 1, characterised in that received signals ($r(t)$) are estimated using an equation

$$r(t) = \sum_n^M a_n e^{j\theta_n} s(t - \tau_n) + n(t)$$

where a_n is amplitude,

θ_n is phase,

10 τ_n is time delay,

$s(t)$ is the transmitted signal,

$n(t)$ is noise and

M is the total number of specular reflections.

15 8. A method as claimed in claim 1, characterised in that the frequency domain analysis is effected by obtaining (68) a power versus distance profile at a receiving point, transforming (70) the power versus distance profile to a power versus spatial frequency domain spectrum, noting (72) non-zero frequency spectral peaks in the power versus spatial frequency
20 domain spectrum due to specular reflections, and matching (76,78) the bound of the at least one parameter of multipath reflection with reflection coefficients derived from spectral analysis of the power versus spatial frequency domain to obtain more accurate values of the at least one parameter.

25 9. A radio system comprising first and second stations (10, 20), the first station (10 or 20) having means (12, 14) for transmitting a signal, the second station (20 or 10) having means (22, 24A to 24D) for receiving the transmitted signal at a plurality of spaced locations, means (26) for analysing the received signal by frequency domain analysis to calculate the number of
30 specular reflections and the reflection coefficient for each specular reflection, one of the first and second stations having means (12, 14) for transmitting and

receiving a radar signal, said one station scaling the received radar signal to appear as if it had been transmitted by the other of the first and second stations, the second station having means (26) for analysing the scaled signal to determine bounds for at least one parameter of the specular reflections, 5 means for utilising the results of the analysis of the radar signal at the second station to reduce the bounds on the at least one parameter (a_n, τ_n) by matching the specular reflection from the frequency domain analysis and the scaled radar signal, and means for optimising a parameter model of the received signal using the reduced bounds on the at least one parameter and 10 the number of reflections identified in the frequency domain analysis.

10. A radio system as claimed in claim 9, characterised in that the second station comprises a plurality of spatially separated antennas (24A to 24D) for receiving the transmitted signal.